

Firm's Characteristics, Public Support and Foreign Direct Investment

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Abstract

Firms competencies and needs may determine movements to foreign locations. Firms may use their own resources to establish or maintain activities of foreign direct investment, or otherwise when internal resources are insufficient they may apply for external support provided by governments.

With a binary probit model applied on a recent survey, a Bayesian filter calculates the probability of a given characteristic's and use of public support contributing to the existence of foreign direct investment.

The results show that some characteristics like the size, labour productivity, age, and domestic ownership, have a noticeable effect on the existence of foreign direct investment. In terms of use of public support, there is evidence that measures that promote informational services, fiscal benefits, and protocols between governmental agencies and banks have positive effects on existence of foreign direct investment. This study may add useful information to help scholars and policy makers to understand competencies that firms need to operate abroad either rooted internally or externally.

Key words: Foreign Direct Investment; Firm Competencies; Public Support

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Contents

1	Introduction	3
2	Firm Competencies, Public Support and Foreign Direct Investment	4
2.1	Firm Competencies and Foreign Direct Investment	5
2.2	Public Support and Foreign Direct Investment	9
3	Methodology	13
3.1	Empirical Setting	13
3.2	Econometric Model	13
3.3	Dependent Variable	14
3.4	Independent Variables	14
4	Econometric Findings	17
5	Conclusions	22
	Appendices	31
A	Correlation matrix	31

1 Introduction

The understanding of foreign direct investment (FDI) has attracted the attention of economists at least since Hymer's demarcation criterion between FDI and portfolio investment (PI) (Hymer, 1960; O'Sullivan, 2000). Despite the work of several scholars in searching for explanations for the existence and development of FDI either at the firm level (Buckley and Casson, 1976; Cantwell, 1989; Cowling, 1982; Johanson and Vahlne, 1977; Knickerbocker, 1973), the country level (Aliber, 1971; Kojima, 1978), or at both levels (Dunning, 1977; Helpman, 1984; Krugman, 1985; Markusen, 1984; Vernon, 1966), there is no full explanation for the existence of FDI.¹

Focusing on the firm-level determinants of FDI, we can find evidence that some firm-specific characteristics such as size, innovative intensity, international experience, financial constraints (or lack thereof), and productivity, among others, have effects on the presence of FDI.

Looking more deeply into these characteristics, we can verify that they are competencies or proxies of the competencies necessary to support the firm's growth, including the growth beyond the borders of its home country.

Along with firm characteristics that emerge from the internal environment, there are external supports provided by governments of home and host countries to strength firm competencies and facilitate the investment process.

If we focus on the outward perspective, i.e., the action of the home country government, we can see that the criteria for evaluating the costs and benefits of the foreign activities of multinational enterprises (MNEs) for home countries have changed over time. Until the 1990s, governments barely highlighted the benefits of outward activities, because outward FDI is associated with the export of jobs and technology. With the globalization of products and markets, home country governments have come to see outward foreign direct investment (OFDI) as an opportunity to increase the competitiveness and comparative advantage of their countries (Dunning and Lundan, 2008). As a result, far from adopting an adversarial policy, many governments seek to promote certain types of outward investments, encouraging their firms to become large-scale and international players.

¹For a structured review of the main research on this subject consider the following approaches and authors: product life cycle (Vernon, 1966); currency areas and internationalization of firms (Aliber, 1971); oligopolistic reactions and the geographical pattern of FDI (?); internalization (Buckley and Casson, 1976; Caves, 1982; Hennart, 1982, 2000; McManus, 1972; Rugman, 1981; Teece, 1977); the Dunning's eclectic framework (Dunning, 1977, 1997, 2000a,b; ?); Kojima's macroeconomic theory (Kojima, 1978, 1982); stages in internationalization process (the Scandinavian School) (Johanson and Wiedersheim-Paul, 1975; Johanson and Vahlne, 1977, 1990); technological accumulation and international activities (Cantwell, 1989, 1991, 1995); new trade theories and the activities of TNCs (Helpman, 1984; Krugman, 1985, 1987, 1991a,b, 1998; Krugman and Venables, 1996; Markusen, 1984; ?; Venables, 1998); transnational monopoly capitalism (Cowling, 1982; Cowling and Sugden, 1987, 1998; Peoples and Sugden, 2000); and Nation states' and TNCs' strategic behaviour (Cowling and Sugden, 1987, 1998; Peoples and Sugden, 2000; Sugden, 1991).

Public support for trade fairs and state missions, public support through training and consulting provision, information provision, international exchange programs for human resources, and international investment agreements (IIAs), investment insurance schemes, venture capital (VC), fiscal benefits, financial support, reduced interest rates, and support related to the development of brand marketing or sales, are instruments that we can find in many countries.

The use of public support provided through internationalization support measures (ISMs) may enhance the firm competencies necessary to operate abroad, not only through exports but also through a more 'aggressive' form of internationalization such as FDI.²

Exploring the differences between firms with and without FDI, we link the firm's internal environment with the external environment. Following this line of reasoning, beyond the firm-level determinants normally found in the literature, this study will expand the domain of the determinants of outward FDI to home country policy aspects.

To collect evidence regarding the role of firms competencies on the presence of FDI, we postulate the following two general hypotheses: first 'firms with FDI may have more competencies than firms without FDI', and second 'firms with FDI may use more public support than firms without FDI'.

The exploratory results of this research suggest that both competencies and use of public support have a noticeable effect on the presence of FDI.

The remainder of this paper is organized as follows: in the next section, we explain the relation between firms' competencies, use of public support and FDI activities. In Sections 3 and 4, we describe the methodology and results. Finally, we report the conclusions in Section 5.

2 Firm Competencies, Public Support and Foreign Direct Investment

It is often considered that a country's most competent and successful firms tend to invest in production abroad (Lipsey, 2004). It is also considered that FDI represents a demanding activity that requires additional competencies on the part of the firm (Duran and Úbeda, 2001; Hymer, 1960; Rugman, 1980; Zaheer, 1995).

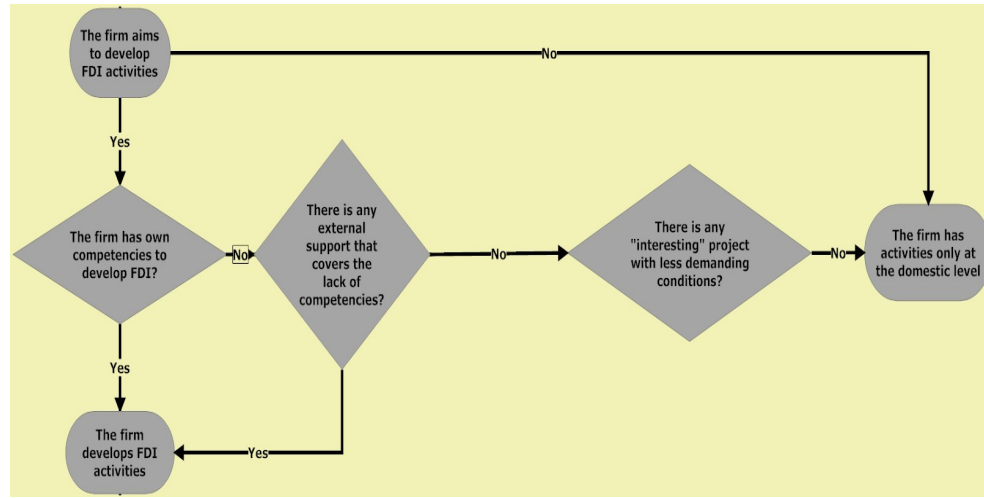
Otherwise, the engagement of domestic companies in international business

²In particular, FDI entails a greater need of competencies and a greater foreign resource commitment than exporting or merely domestic operations. FDI is more difficult to reverse and less flexible in dealing with risks such as adverse market conditions. Hence, public support may have a reinforced importance when used by firms with investments in distant environments (in geographical, cultural and institutional terms) (Svetličič, 2007; UNCTAD, 2001; Te Velde, 2007).

may represent a determinant of competitiveness for developed and developing countries.³ Then despite the existence of some ‘voices’ against public intervention, several economies have invested public resources to assist the internationalization of their firms on the last decade, not only through exports but also with positive discrimination in favor of firms with OFDI (Luo et al., 2010).

Public support may cover the extra needs that firms have on foreign environments. Then, to better elucidate this, the Figure 1 shows that if we consider that when a firm aims to develop FDI, it may face three scenarios. First, the firm has own competencies to develop or maintain FDI activities and this is done without any external support. Second, the firm does not have sufficient competencies and uses external support, here there are at least two ways: find other firms that may complement their competencies and/or if public support are available use it to materialize the FDI. Third, without any external support or competencies at the internal level, the firm remains in its initial condition, i.e., possessing activities only at the domestic level.

Figure 1: The Decision to Develop FDI, Competencies and Public Support



Source: Own elaboration

2.1 Firm Competencies and Foreign Direct Investment

Competencies are characteristics resulting from firms’ autonomous accumulation of resources (either tangible and intangible), unlike the public support

³The literature often indicates that internationalization stimulates foreign exchange revenues, employment, innovatory capacity, and economic development of home economies (EURO, 2010; Falk and Wolfmayr, 2010; Koksall, 2009; Molnar et al., 2007).

that is externally sourced.

Exploring the relation between firms' endogenous competencies and the existence of FDI, several studies have suggested that size, innovative intensity, international experience, lack of financial constraints, productivity, ownership, age, and qualification of human capital are features that distinguish firms with FDI from firms without FDI.⁴

The firm's size may represent economies of scale and often firms' potential growth. In fact, it may proxy several advantages that facilitate the existence of FDI for larger firms. These advantages may include favorable costs, and the availability of and access to capital. Besides this capacity of larger firms to deal with the financial markets, other advantages may lead these firms to a privileged position in carrying out FDI. A greater ability to diversify, to bear the risk and uncertainty associated with foreign operations, a large resource base and easy access to market information, the knowledge of procurement sources and the ability to undertake large ventures without undue risk are some of the non-financial advantages that larger firms may have. Thus, based on this rational and on much empirical evidence, we can assume that larger firms are more likely to carry out FDI than smaller firms.⁵ Along with advantages of scale, knowledge advantages have been widely studied. In general, the evidence points to a positive relation between large investments in research and development (R&D) and the existence of FDI.⁶ Foreign investments are a way of gathering and internalizing knowledge, avoiding the costs of patents and the risks of licensing (Buckley and Casson, 1976; Hennart, 1982, 1994; Horstmann and Markusen, 1987; Rugman, 1981; Teece, 1981). Moreover, the access to firm-specific assets and national differences in technical activity may motivate FDI, not necessarily due to internalization but also due to the greater dynamics and performance of more innovative firms (Cantwell, 1989; Chung and Yeaple, 2008; Kogut and Zander, 1993; Lu and Beamish, 2001). In addition, we should consider that many FDI projects were made in order to source knowledge, which increases the probability of more innovative firms being found in the pool of foreign direct investors (Zahra et al., 2000). Finally, as FDI often requires product adaptation to host-country tastes, FDI is a way to improve new products that may require higher levels of innovation in their development.

International experience and involvement through exports⁷ are proxies the firms' familiarity with foreign markets. One or another may represent im-

⁴We consider that some of these characteristics such as size, ownership or age, are not necessarily competencies but structural characteristics (Gupta, 1980), however, we agree with the idea that they may represent proxies of competencies, and because of this assumption they were included in this study as competencies.

⁵See: Horst (1972); Wolf (1977); Grubaugh (1987); Terpstra and Yu (1988); Blomström and Lipsey (1991); Odagiri and Yasuda (1996); Louri et al. (2000); Pradhan (2004); Todo (2011)

⁶See: Grubaugh1987, Hennart1994, Horst1972a, Odagiri1996, Pradhan2004, Wolf1977

⁷Hereafter, 'export experience and export involvement'.

portant advantages that favor the existence of FDI. Export experience is often considered as a pre-condition for FDI when firms gather information of the targeted market(s) (e.g., size, consumer preferences, government policy) (Svetličič, 2007).⁸ In terms of export involvement, we verified that many foreign direct investors supply directly (their) foreign subsidiaries from the home country, internalizing several advantages.

Analyzing the role of financial constraints on the existence of FDI, recently Todo (2011) presented empirical evidence that the indebtedness of Japanese firms may render more difficult their FDI. Indeed, firms often cite not only internal difficulties but also external financing constraints as primary obstacles to investment and business expansion (Harrison et al., 2004). Firms with higher financial constraints may have less (internal) resilience⁹ to support the requirements of growth through international activities and the capacity to give external signals of solvency (Louri et al., 2000; Stevens, 1994). At this level (externally), the information problem, the lack of collateral, the home bias of financiers and of the capital gearing method used by banks to evaluate foreign projects, give rise to financial constraints, particularly in small and medium enterprises (SMEs) (Maeseneire and Clayes, 2007).

The firm's efficiency measured by productivity was often identified as been related with the existence of FDI. Using the data on exports and FDI sales of U.S. firms in 38 countries and 52 industries, Helpman et al. (2004) found that firms with low-productivity choose to serve only the domestic market. Otherwise, when they isolate the firms operating abroad, they found that the most productive firms choose to invest in foreign markets while the less productive ones choose to export. The roughly same results were presented by Head and Ries (2003), Kimura and Kiyota (2006) and Tomiura (2007), comparing Japanese firms with and without exports and FDI. The rationale that supports this evidence may be related with capacity to support more demanding conditions or that the efficiency gained as a result of productivity increases by foreign direct investors through coordination of different types of resources and locations. Moreover, the more productive firms use resources more efficiently which increases their competitiveness, increasing the likelihood of finding them carrying out FDI.

Assuming that FDI is an activity that requires competencies, which in itself takes time to develop and accumulate,¹⁰ the firms' age may be a proxy of accumulated intangible and tangible assets necessary to organize and develop FDI. The knowledge resulting from learning-by-doing (in production, marketing and R&D) and organizational experience tend to increase in the

⁸This action covers the lack of knowledge of foreign markets (Johanson and Vahlne, 1977, 2009); therefore following the evidence presented by Pradhan (2004), firms with more export experience are more likely to be foreign direct investors than firms without FDI.

⁹In terms of borrowing capacity, liquidity and solvency.

¹⁰Here, we exclude the particular case of born globals.

course of time as well as the physical assets (Lall, 1983; Pradhan, 2004; Pradhan and Singh, 2009).

Along with age, the human capital is gained through time by workers with education and professional experience (Sullivan and Sheffrin, 2003).¹¹ Assuming that firms with FDI perform better,¹² and supposing that this performance (also) depends on more qualified human capital (in general not only managerial skills), we assume that firms with FDI may have more skilled human capital than firms without FDI.

In accordance with these lines of reasoning, we formulate the following hypothesis:

Hypothesis 1: Firms with FDI may have more 'competencies' than firms without FDI.

Beyond the above mentioned aspects, other firm-related aspects may explain the existence of FDI. Specifically, the role of family businesses' (FBs) internationalization on the existence of FDI is quite ambiguous. Kontinen and Ojala (2010) in a review of 25 papers found that the factors inhibiting FBs internationalization are mainly organizational: they include an unwillingness to accept outside expertise, a fear of losing control, risk avoidance, and a lack of financial resources. Otherwise, the factors enhancing the internationalization of FBs include a general long-term orientation and speed in decision-making. Lien et al. (2005) is in line with this, presenting evidence that the highly centralized control in FBs can both increase flexibility in strategic decision-making and improve co-ordination in responding quickly to international competition, in comparison to firms in which the ownership is more widely dispersed. Furthermore, risk diversification may provide a further motive: most FBs typically hold undiversified investment portfolios, and are thus exposed to specific risk. International diversification through FDI should ease their exposure in foreign markets, and should reduce the volatility of their cash flows (Lien et al., 2005).

The subsidiaries of MNEs normally do not undertake FDI. The host-country is the 'last stop' and not a 'shift point' in a triangulation to create FDI in another country.¹³ This supposition goes in line with the results obtained by Lien et al. (2005) with a sample of Chinese investors in Taiwan, and by Todo (2011) with foreign-owned investments in Japan.

Another aspect of interest barely explored relates the origin of firms (between central and peripheral areas) within the home country and the existence of

¹¹We define human capital as the workers' competencies, knowledge, and personality attributes embodied in the ability to perform labour.

¹²When firms first begin FDI activity, profitability normally declines due to the incremental effort made, but greater levels of FDI are associated with higher performance abroad and at home (Lu and Beamish, 2001).

¹³Even if remotely some reasons (common language, culture, etc.) justify such an action.

FDI. Firms located in central areas benefit from economies of agglomeration, specifically from the flow of knowledge between peers making imitation and knowledge diffusion of the international processes easier (Bennett et al., 2001). Hence, it is to be expected that this aspect gives to firms located in central areas some advantage in carrying out FDI compared to firms located in the periphery.

2.2 Public Support and Foreign Direct Investment

The public support that firms may use for FDI activities can be found within two groups: non-financial and financial measures, hereafter internationalization support measures (ISMs).

Non-financial ISMs consist of trade fairs and state missions, public support through training and consulting provision, information provision, international exchange programs for human resources, and international investment agreements (IIAs).¹⁴ The financial ISMs consist of investment insurance schemes, venture capital (VC), fiscal benefits, subsidies, reduced interest rates, and supports related with the development of brand marketing or sales. Then, we briefly describe these measures and analyse their potential relationship with the existence of FDI.

The promotional actions developed in host-countries through trade fairs and state missions (TFSM) provide potential exporters and investors with opportunities to evaluate *in loco* markets potential, to develop commercial structures by identifying new agents and distributors, and to initiate potential partnerships. The role of TFSM on exports (efficiency, usefulness, impact, etc.) have been often studied (Africano et al., 2011; Nitsch, 2007; Spence, 1999; Seringhaus, 1987, 1989; Seringhaus and Mayer, 1988; Seringhaus and Rosson, 1989; Wilkinson and Brouthers, 2006) is unlike the effects of TFSM on FDI. On this particular issue, we only found evidence in Wilkinson and Brouthers's study that reveals a positive relation between the number of trade missions and the existence of US affiliates in other countries (Wilkinson and Brouthers, 2000). Assuming the validity of this result and the non-relevance of the source that may support the firm (home or host country), we consider that home country supports to TFSM will have the same effect on the existence of outward FDI as the support provided by the host country, i.e., firms that participated in state missions (and trade fairs) more likely have FDI than firms without participation in such activities.

The use of training and consulting services has an important role in overcoming firms' lack of internal skills, through the entry of knowledge into the firm (Marshall et al., 1993). These services provide intelligent advice and outside perspective. However, the external interference in firm opera-

¹⁴Some of these ISMs may be considered partially as financial, but we consider that they are primarily non-financial.

tions and especially their cost often prevent the use of such interventions. This failure was identified by many governments that found here a reason to support private activities directly with financial support. Considering the proper use of such support and its positive impact on business activities, we can assume that users of training and consulting services more likely have FDI than firms that have not used this support.

Hymer (1960), Rugman (1980) and others have pointed to the need for communication and acquisition of information as sources of extra costs for firms with foreign production.¹⁵ As these costs are not compatible with the budgets of many firms, governments intervene by creating public organizations to provide information and networks between entrepreneurs. This action aims at remedying imperfections in the information about foreign markets suffered by mainly the less skilled firms. As the information and networks concerning foreign markets are issues that matter more to firms with foreign activities (especially FDI) than to firms without such activities, we consider it more likely that firms with FDI have used this support than firms without FDI.

International exchange programs for human resources basically consist of traineeships in foreign firms in order to improve the competencies of human capital, especially the most qualified. As this support aims to create competencies through the establishment of networks between two firms located in different countries, it may be of more interest to firms with previous contacts abroad than to firms without contacts. The firms with FDI are more likely have interest in the use of this support than firms without FDI.

International investment agreements (IIAs) are treaties between countries that address issues relevant to cross-border investments, usually for the purpose of protection, promotion and liberalization of such investments (Tortian, 2007). Countries concluding IIAs commit themselves to adhere to specific standards on the treatment of foreign investments within their territory.¹⁶ The benefit of IIAs (at least directly) is not achieved by firms without FDI, therefore it is more likely that firms with FDI benefit from the existence of IIAs established by their country with other countries than firms without FDI.

The risk of foreign operations can be bypassed with the hiring of investment insurance, trade credit insurance, and mutual funds. Investment insurance typically provides coverage against risks such as currency inconvertibility, ex-

¹⁵These costs are linked to the different cultural, linguistic, legal, economic and political environments of the host countries.

¹⁶We consider the following to be examples of IIAs: Bilateral Investment Treaties (BITs), Preferential Trade and Investment Agreements (PTIAs), as well as International Taxation Agreements and Double Taxation Treaties (DTTs).

propriation, and war.¹⁷Trade credit insurance¹⁸protect firms' balance sheet asset, accounts receivable, losses due to credit risks such as protracted default, insolvency, or bankruptcy. Mutual funds are collective investment schemes that pool money from many investors to buy stocks, bonds, short-term money market instruments, and/or other securities, and values. Since these activities (investment insurance, credit insurance and mutual funds) are in general closely linked to the existence of FDI, we consider that firms that used them are more likely have FDI than firms who have not used this type of measure. However, we can not exclude the existence of some ambiguity derived from the fact that firms with only exports may use this measure more than firms with only FDI.

Venture capital (or risk capital) is financial capital provided in general to early stage, high potential, high risk, growth startup companies. Firms that mainly use this support are active internationally. We expect that the use of VC is positively related with the existence of FDI.

Fiscal benefits normally consist of a percentage tax credit for the FDI done abroad (on greenfield and acquisitions but also on promotional events including trade fairs). As the benefit of this support results from the objective establishment of outward FDI, often the value of the benefit being calculated on the basis of the FDI's value, firms that used this support are more likely to have FDI than firms that did not use this support.

Other financial support consists mainly of subsidies, materials of promotion and dissemination, including advertising campaigns, organization of conferences, rental of promotional spaces, and costs with audit systems. As the benefit of this support results from the development of activities previous to the establishment of foreign subsidiaries, firms that used this support are more likely to have FDI than firms that did not use this support.

The existence of protocols by governmental agencies with some banks giving better conditions to internationalized firms is a common practice of positive discrimination in several countries. With these protocols, firms may benefit from reduced interest rates or other banking expenses. As the benefit of this support is related with activities developed in foreign markets, firms that used this support are more likely to have FDI than firms that did not use it.

Finally, supposing that public support for acquiring or developing brands, marketing or sales was used by firms with some competencies to materialize their projects, the firms that used this support are more likely to have FDI than firms that did not use this support.

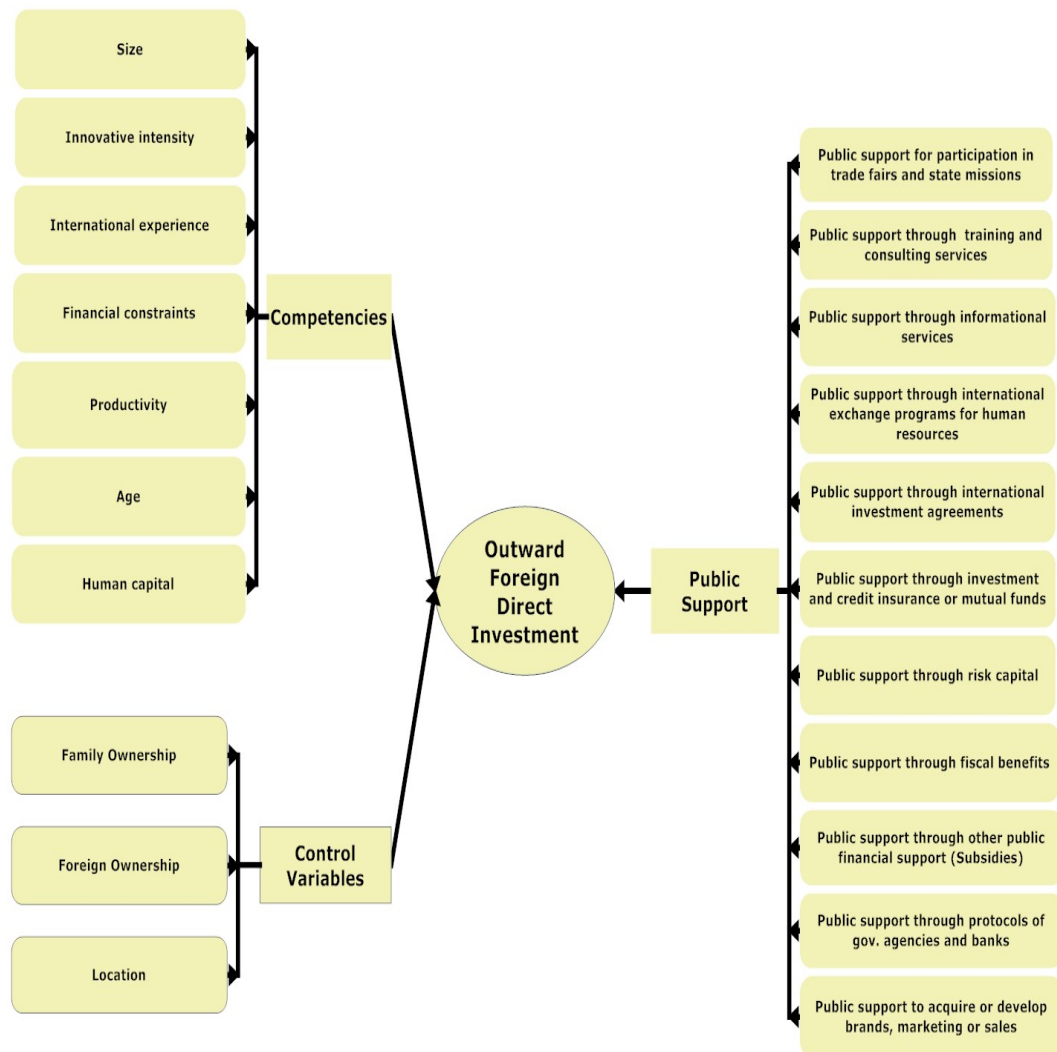
In accordance with these lines of reasoning and considering FDI as a demanding activity, we formulate the following hypothesis:

¹⁷It is available from a number of sources, including nationally-sponsored insurance agencies and private insurers, and the World Bank's Multilateral Investment Guarantee Agency (MIGA) (Comeaux and Kinsella, 1994).

¹⁸Products offered by private insurance companies or governmental agencies.

Hypothesis 2: Firms with FDI may benefit (use) more public support than firms without FDI.

Figure 2: Firm Competencies and Public Support for Outward Foreign Direct Investment



Source: Own elaboration

3 Methodology

3.1 Empirical Setting

The aim of this paper is to analyse whether there is a causal effect from firms' competencies on the existence of FDI. In particular, we test if both the firm characteristics and public support are significant for the existence of FDI. To do this, we will use data from a survey of Portuguese firms recently developed. In this survey we contacted 4637 firms distributed proportionately all over the country in order to obtain information from 441 firms, 104 of them with FDI.¹⁹

Three groups of information compose the data obtained. First, information concerning the existence of FDI. Second, information concerning firm's characteristics (e.g., size, innovative intensity, international experience, etc.). Third, information concerning use or not of 11 ISMs presented in subsection 3.4.

If we consider the existence in Portugal of approximately 600 firms with FDI (Ietto-Gillies, 2005), this sample represents more than 16% of the universe of firms with FDI. Hence, we consider the response rate as acceptable within the usual margins for studies of this kind. However, generalizations should be avoided.

3.2 Econometric Model

We modeled the effects of firms' characteristics and use of public support on the existence of FDI through a binary probit model (BPM). As the simplest probability model, the BPM has only two categories in the response variable, which fits with our research question (existence or not of FDI). Probit models are generalized linear models (GLM) with a probit link (Liao, 1994):

$$\eta = \Phi^{-1}(\mu) \quad (3.1)$$

The inverse of the normal cumulative distribution function (CDF) is in effect a standardized variable, or a Z score. We may express the model in probability,

$$Prob(y = 1) = 1 - F\left(-\sum_{k=1}^k \beta_k x_k\right) = F\left(\sum_{k=1}^k \beta_k x_k\right) = \Phi\left(\sum_{k=1}^k \beta_k x_k\right) \quad (3.2)$$

where the more general form of cumulative distribution function, F , is re-

¹⁹This represents almost one percent of Portuguese firms in 2009 and 10% of the firms contacted.

placed by the standard normal cumulative distribution function, Φ . Probit models take on only one intuitively meaningful form, because a probit model expressed in μ is a linear regression of the Z score of the event probability. The equation for probability of the nonevent can be readily derived from Equation 3.2, and is

$$Prob(y = 0) = 1 - \Phi\left(\sum_{k=1}^k \beta_k x_k\right) \quad (3.3)$$

3.3 Dependent Variable

The existence of FDI is the dependent variable. The FDI may result from greenfield investments, mergers and acquisitions, or joint-ventures. We consider a firm as having FDI if it has in the year 2008 one or more participations, each of them at least of 10%, in the equity of a foreign firm. The firms with FDI (MNEs) make up 23.6% of the sample and the firms without FDI (DFs), 76.4%.

3.4 Independent Variables

Following the discussion initiated in Section 2, the independent variables included in the model are labeled in two groups as firm's characteristics and public support.

The firm's characteristics, some of them competencies others proxies of competencies (such as size, age) are the following:

- *firm size* (SIZE) is measured by the number of employees of each firm in 2008;
- *Innovative intensity* (RDI) is measured by the weight ratio of R&D expenditures (RDE) to the total of sales (S) in the year 2008 (t);

$$RDI = \frac{RDE_t}{S_t} \quad (3.4)$$

- *firm international experience (as exporters)* (EXPX) is measured by the years of export activity (difference between the year 2008 (t) and the year the firm began exporting (t_e));

$$EXPX = t - t_e \quad (3.5)$$

- *firm financial constraints* (FCS) is measured by the weight ratio of liabilities to assets in the year 2008 (t);

$$FCS = \frac{LIABILITIES_t}{ASSETS_t} \quad (3.6)$$

- *firm labor productivity* (PROD) is measured by the weight ratio of sales (S) to number of employees (SIZE) in the year 2008 (t);

$$PROD = \frac{S_t}{SIZE_t} \quad (3.7)$$

- *firm age* (AGE) measured in years (difference between the year 2008 (t) and the year of establishment (t_f));

$$AGE = t - t_f \quad (3.8)$$

- *human capital* (HRQ) is measured by the weight ratio of the number of employees with bachelor's degree (BA) to total of employees (SIZE) in the year 2008 (t);

$$HRQ = \frac{BA_t}{SIZE_t} \quad (3.9)$$

Along with the variables above, we considered the following control variables:

- *Family ownership* (FAM) is a binary variable (0 if non family-owned and 1 if family-owned);
- *Foreign ownership* (FF) is a binary variable (0 if non foreign-owned and 1 if foreign-owned);

- *Location* (LOC) a binary variable (0 if located in a central region and 1 if located in a peripheral region).

The descriptive results show that a typical firm has on average 24 years of existence, 12 years as exporter, 529 employees, 23% of which have a bachelor's degree. It has an innovative intensity approximately of 4%, an indebtedness of 43% of its assets, and 44,523 euros of sales per worker. The family-owned firms are 28%, foreign-owned firms are 11.5%, and the firms located in peripheral regions are 76%.

Comparing the averages of MNEs and DFs, we can verify that MNEs are larger, 982 employees against 389 of DFs, less innovative, 3.4% against 4.6% of DFs, have the same export experience, 12 years, are slightly more indebted than DFs, 44.7% against 42.6% of DFs, are more productive, 70,770 euros sold by employee against 36,423 euros of DFs, are older, 29 years against 22 years of DFs, have less qualified human capital, 18.4% of the employees with bachelor's degree against 24.6% of DFs, with a greater percentage of family-owned firms, 32.7% against 26.1% of DFs, with a small percentage of foreign-owned firms, 0.05% against 11.5% of DFs, and less likely to be located in peripheral regions, 73.1% against 76.7% of the DFs.

In terms of public support, the 11 ISMs were evaluated as binary variables (used or not used) and reported with law instruments by year bellow:

- ISM1 -*Public support for participation in trade fairs and state missions* identified in law 560/2004 and law decree 1463/2007;
- ISM2 -*Public support through training and consulting services* identified in law 560/2004;
- ISM3 -*Public support through informational services* identified in law 560/2004 and law decree 245/2007;
- ISM4 -*Public support through international exchange programs for human resources* identified in law 1103/2008;
- ISM5 -*Public support through international investment agreements (IIAs)* identified in law decree 245/2007 and law 249/2009;
- ISM6 -*Public support through investment and credit insurance or mutual funds* identified in law decree 245/2007;

- ISM7 -*Public support through venture capital (VC)* identified in law decree 245/2007;
- ISM8 -*Public support through fiscal benefits* identified in laws decree 401/1999 and 249/2009;
- ISM9 -*Public support through other public financial support* identified in laws 1254/2003, 560/2004, in the ministerial decree 1998/2006, and in law decrees 290/1994, 187/2007, 1463/2007, 250/2008, 65/2009 and 353-A/2009;
- ISM10 -*Public support through protocols of governmental agencies and banks* identified in law decree 245/2007;
- ISM11 - *Public support for acquiring or developing brands, marketing or sales* identified in laws 1254/2003 and 560/2004, and in law decrees 290/1994, 1463/2007, 250/2008, 353-A and 1020;

Table 1 shows that besides the use of ISM3, ISM7 and ISM8 that were used by more than 40% of the firms, the remaining ISMs are barely used by the larger part of the firms. Isolating the MNEs, we verify that besides these measures also the ISM1 and ISM2 overcome the barrier of 40% of firms using each measure. Otherwise, in DFs only ISM3 and ISM7 are relevant.

In order to verify whether there are correlations between the variables (White, 1980), we calculated the correlation matrix and present it in Table 5 of Appendix B. It reveals acceptable correlations between the variables included in the model.

4 Econometric Findings

The results from the binary probit model that computes the probability of existence of FDI in presence of a set of firms characteristics and public support overall suggest that firms with FDI have more competencies that may emerge from internal resources, and tend to complement these competencies with the use of public support, confirming the hypothesis one and two.

Table 2 suggests that firms with FDI included in the sample are larger, more productive, older, and more likely to be domestically owned than firms without FDI.

In particular, the role of firm size in the existence of FDI comes up with a significant positive coefficient. This confirms the hypothesis that firms with FDI are larger than firms without FDI, a result that is in line with evidence collected in other economies by Horst (1972), Wolf (1977), Grubaugh

Table 1: Summary Statistics

Variable	Mean or %			Number of Firms		
	DFs	MNEs	All	DFs	MNEs	All
Size	389.0	982.0	529.0	337.0	104.0	441.0
Innovative intensity	4.6%	3.4%	4.3%	337.0	104.0	422.0
International experience	12.00	12.00	12.00	337.0	104.0	441.0
Financial constraints	42.6%	44.7%	43.1%	337.0	104.0	440.0
Productivity	36.423	70.770	44.523	337.0	104.0	441.0
Age	22.00	29.00	24.00	337.0	104.0	441.0
Human capital (Workers with BA)	24.6%	18.4%	23.1%	337.0	104.0	440.0
Family ownership	26.1%	32.7%	27.7%	337.0	104.0	441.0
Foreign ownership	11.5%	4.8%	.9%	337.0	104.0	441.0
Location in a peripheral region	76.7%	73.1%	76.0%	337.0	104.0	440.0
ISM1 - Trade fairs and state missions²⁰	26.7%	51.0%	32.4%	337.0	104.0	440.0
ISM2 - Training and consulting	30.3%	47.1%	34.2%	337.0	104.0	440.0
ISM3 - Informational services	56.4%	76.9%	61.2%	337.0	104.0	440.0
ISM4 - Exchange programs for Human Resources	21.1%	26.0%	22.2%	337.0	104.0	440.0
ISM5 - International investment agreements	37.7%	36.5%	37.4%	337.0	104.0	440.0
ISM6 - Investment and credit insurance and mutual funds	14.2%	13.5%	14.1%	337.0	104.0	440.0
ISM7 - Venture capital	41.2%	46.2%	42.4%	337.0	104.0	440.0
ISM8 - Fiscal benefits	31.2%	83.7%	43.5%	337.0	104.0	440.0
ISM9 - Other financial support	12.5%	19.2%	14.1%	337.0	104.0	440.0
ISM10 - Protocols with banks	10.1%	20.2%	12.5%	337.0	104.0	440.0
ISM11 - Support for acquiring brands, marketing or sales	16.9%	19.2%	17.5%	337.0	104.0	440.0

Source: Own elaboration

(1987), Terpstra and Yu (1988) and Blomström and Lipsey (1991) in the US, by Odagiri and Yasuda (1996) and Todo (2011) in Japan, by Louri et al. (2000) in Greece, and by (Pradhan, 2004) in India. Table 3 show the results of the marginal effects, here we verified that an additional employee will increase less than 0.001% the likelihood of finding a firm with FDI. Size may indicate the presence of a large resource base that provides the necessary competencies to face demanding activity like FDI. In fact, larger firms have at least three groups of interrelated advantages that allow them to face FDI activities more comfortably than smaller firms. First, the financial advantages linked with favorable costs, availability and access to capital. Second, the organizational advantages that allow greater efficiency with diversification of activities by several locations exploring cost advantages and reducing the risks of activity. Third, the knowledge advantages resulting from a large resource base that allow an easy access to market information and procurement sources.

The firm's size may be related with productivity that comes up with a signif-

icant positive coefficient.²¹ This corroborates the idea that firms with FDI are more productive than firms without FDI, and assuming the productivity as a measure of efficiency, that firms with FDI can coordinate their resources by several locations due to their better levels of efficiency.

The role of firm age in the existence of FDI comes up with a significant positive coefficient.²² This result can be interpreted from two perspectives. First, FDI is a demanding activity that needs competencies accumulated in time and firms act strategically, only initiating FDI when all necessary competencies are available. Second, older firms are the survivors that found the ways to growth, and foreign markets were one of the possible ways to do so.

The role of a firm's being foreign owned in the existence of FDI comes up with a significant negative coefficient.²³ Despite the strong ties of Portugal with countries like Brazil, Angola and Spain among others, the idea that some countries, due to some historical or cultural ties with third countries, may be like 'aircraft carriers', seems unsupported.

Firms with FDI seem to complement their endogenous competencies with a tendency to use of some specific measures of support: Public support through informational services,²⁴ public support through fiscal benefits,²⁵ public support through protocols between governmental agencies and banks.²⁶ The tendency of firms with FDI to use more public support through informational services may reveal that foreign investors suffer from lack of information to develop their activities, and governmental agencies provide it easily and often for free.

The tendency of firms with FDI to use more public support through fiscal benefits than firms without FDI may reveals a behavior against the existence of taxes. With FDI firms end up having a reducing in taxes and this action allows somewhat of reinvestment of profits (Hall and Jorgenson, 1967, 1969).

The tendency of firms with FDI to use more public support through protocols between governmental agencies and banks than firms without FDI may reveal the capacity of these firms to engage in such contracts.

²¹Analysing the marginal effects, we verified that an increase of 1% in productivity will increase less than 0.001% the likelihood of finding a firm with FDI.

²²Analysing the marginal effects, we verified that an increase of 1 year in firm age will increase 0.3% the likelihood of finding a firm with FDI.

²³Analysing the marginal effects, we verified that a foreign-owned firm has less than 12.2% likelihood of being found in the pool of firms with FDI.

²⁴Analysing the marginal effects, we verified that firms that used ISM3 have 6.5% more likelihood of being found in the pool of firms with FDI.

²⁵Analysing the marginal effects, we verified that firms that used ISM8 have 28.4% more likelihood of being found in the pool of firms with FDI.

²⁶Analysing the marginal effects, we verified that firms that used ISM10 have 13.8% more likelihood of being found in the pool of firms with FDI.

Table 2: Estimation Results with Probit Model

Dependent variable: Existence of FDI		
Independent Variables	Coefficient	(Std. Err.)
Size	0.000*	(0.000)
Innovative intensity	0.204	(1.051)
Export experience	0.008	(0.008)
Financial constraints	0.479	(0.466)
Productivity	0.000*	(0.000)
Age	0.018***	(0.005)
Human capital	-0.557	(0.377)
Foreign ownership	-1.152***	(0.317)
Family ownership	-0.001	(0.221)
Peripheral location	-0.254	(0.229)
Use of Public support for participation in trade fairs or state missions	0.108	(0.224)
Use of Public support through training/consulting services	0.207	(0.224)
Use of Public support through informational services	0.443*	(0.250)
Use of Public support through international exchange programs for human resources	-0.065	(0.243)
Use of Public support through IIAs	-0.080	(0.234)
Use of Public support through investment and credit insurance and mutual funds	-0.097	(0.300)
Use of Public support through venture capital	-0.334	(0.227)
Use of Public support through fiscal benefits	1.553***	(0.237)
Use of Public support through other financial incentives	-0.212	(0.315)
Use of Public support through protocols with banks	0.661**	(0.291)
Use of Public support to acquiring/develop brands, marketing or sales	-0.163	(0.248)
Intercept	-2.473***	(0.447)
N	420	
Log-likelihood	-125.696	
$\chi^2_{(21)}$	151.765	
Significance levels: * : 10% ** : 5% *** : 1%		
Source: Own elaboration		

Table 3: Marginal Effects After Probit

Variable	dy/dx	S.E.	Z	Sig.	95% I.C.	
					L.L.	U.L.
Size	0.000	0.000	1.590	0.112	0.000	0.000
Innovative intensity	0.031	0.159	0.1900	0.846	-0.281	0.343
Export experience	0.001	0.001	1.060	0.289	-0.001	0.004
Financial constraints	0.073	0.071	1.020	0.306	-0.067	0.212
Productivity	0.000	0.000	1.890	0.058	0.000	0.000
Age	0.003	0.001	3.540	0.000	0.001	0.004
Human capital	-0.085	0.057	-1.480	0.138	-0.197	0.027
Foreign ownership	-0.122	0.027	-4.490	0.000	-0.175	-0.069
Family ownership	-0.000	0.034	-0.000	0.997	-0.066	0.066
Peripheral location	-0.042	0.042	-1.010	0.314	-0.125	0.040
Use of ISM1	0.017	0.036	0.470	0.639	-0.054	0.088
Use of ISM2	0.033	0.038	0.870	0.382	-0.041	0.107
Use of ISM3	0.065	0.035	1.860	0.063	-0.004	0.133
Use of ISM4	-0.010	0.035	-0.270	0.784	-0.078	0.059
Use of ISM5	-0.012	0.034	-0.350	0.728	-0.080	0.056
Use of ISM6	-0.014	0.042	-0.340	0.735	-0.096	0.067
Use of ISM7	-0.049	0.033	-1.490	0.136	-0.114	0.016
Use of ISM8	0.284	0.045	6.340	0.000	0.196	0.371
Use of ISM9	-0.0290	0.039	-0.750	0.453	-0.105	0.047
Use of ISM10	0.138	0.080	1.740	0.083	-0.018	0.294
Use of ISM11	-0.023	0.033	-0.700	0.485	-0.088	0.042

Source: own elaboration

5 Conclusions

Foreign direct investment is a demanding activity which consumes a considerable amount of resources. This study offers evidence that firms need competencies to undertake outward foreign direct investment. Such competencies can be obtained internally or externally.

Internally, characteristics like size, productivity and age seems to be significant to the existence of foreign direct investment. Unlike the foreign ownership that seems to be significant to the nonexistence of foreign direct investment.

Externally, the requirements of foreign direct investment leads us to assume that firms with investments abroad enlist such public support to complement their competencies necessary to overtake the difficulties they encounter during the development of foreign direct investment. However, the low use of a large number of internationalization support measures suggests that the importance of public supports in general are not so determinant to the existence of foreign direct investment as could be expected.

Despite this result, firms with foreign direct investment tend to use more three measures than firms without foreign direct investment: public support through informational services, fiscal benefits and protocols between governmental agencies and banks.

This study is the first large scale representative firm-based survey with evidence on both firms' competencies and public support on the existence of outward foreign direct investment activities. These results are relevant for scholars and particularly for economic policy makers who, with a better understanding of the role of firms' competencies on foreign direct investment, may thus rationalize their interventions.

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Appendices

A Correlation matrix

Table 4: Cross-correlation table

Variables	SIZE	RDI	EXPX	FCS	PROD	AGE	HRQ	FF	FAM	LOC	ISM1	ISM2	ISM3	ISM4	ISM5
SIZE	1.000														
RDI	0.071	1.000													
EXPX	-0.007	0.122	1.000												
FCS	-0.060	0.009	-0.004	1.000											
PROD	0.154	0.052	-0.030	-0.057	1.000										
AGE	0.255	-0.026	-0.004	-0.075	0.080	1.000									
HRQ	-0.059	0.074	0.024	-0.066	0.174	-0.144	1.000								
FF	-0.025	-0.002	-0.006	0.068	0.147	0.118	-0.029	1.000							
FAM	-0.042	-0.096	-0.035	0.038	-0.054	0.052	-0.205	-0.298	1.000						
LOC	-0.102	-0.020	0.052	-0.031	-0.049	-0.223	-0.023	-0.271	0.134	1.000					
ISM1	-0.082	-0.052	-0.144	0.065	-0.055	-0.051	0.067	-0.183	0.037	0.084	1.000				
ISM2	-0.090	-0.061	-0.100	-0.012	0.072	-0.099	0.055	-0.213	0.034	0.160	0.439	1.000			
ISM3	0.063	-0.124	-0.222	0.008	-0.071	0.012	0.045	-0.156	-0.028	0.032	0.333	0.290	1.000		
ISM4	0.053	0.028	-0.100	-0.005	-0.030	-0.047	0.152	-0.158	0.035	0.122	0.189	0.304	0.246	1.000	
ISM5	-0.005	-0.093	-0.027	0.119	-0.031	0.066	-0.013	-0.020	-0.056	0.089	0.177	0.073	0.238	0.079	1.000
ISM6	0.034	-0.083	-0.082	0.073	-0.064	-0.018	-0.087	-0.082	-0.058	-0.008	0.134	0.113	0.284	0.139	0.400
ISM7	0.006	-0.066	-0.142	0.132	0.068	0.090	-0.026	0.129	-0.095	0.005	0.115	0.080	0.369	0.066	0.300
ISM8	0.042	-0.113	-0.118	0.038	-0.027	0.099	-0.056	-0.115	-0.042	0.002	0.291	0.195	0.342	0.015	0.200
ISM9	0.068	-0.027	-0.116	0.064	0.007	0.034	-0.036	-0.073	-0.119	0.060	0.026	0.134	0.282	0.207	0.200
ISM10	0.027	0.135	-0.066	0.086	0.110	0.094	-0.017	0.176	-0.095	-0.093	0.105	0.046	0.131	0.095	0.100
ISM11	0.084	0.021	-0.044	0.053	-0.022	0.033	-0.021	-0.065	-0.047	-0.022	0.123	0.159	0.232	0.124	0.300